

FINAL DIAGNOSES
OF THE REMAINS OF:
ALAN C. LANCASTER

- I. Investigation by the Missouri Department of Corrections and Texas County Coroner reports that the decedent, Alan C. Lancaster, was found unresponsive in his cell. Baggies of probable drugs were found at the scene. The investigator's report is on file.
- II. Lethal trauma not identified.
- III. Cardiomegaly (560 grams).
- IV. Nasopharyngeal swab **positive** for the virus that causes COVID-19.
- V. Toxicology positive for **fentanyl**, **xylazine**, and metabolites of marijuana (see attached Toxicology Report).

OPINION:

In my opinion, the cause of death of Alan C. Lancaster is acute fentanyl and xylazine toxicity with cardiomegaly as a significant contributing condition.

Deirdre Amaro, M.D.

March 6, 2023

POSTMORTEM EXAMINATION
OF THE REMAINS OF:
ALAN C. LANCASTER

A postmortem examination is performed at the Boone/Callaway County Medical Examiner's Office on February 1, 2023 on the remains of an adult male identified as Alan C. Lancaster. The race is reported as black. The autopsy is performed under the authority of state law and is requested by the Missouri Department of Corrections and Texas County Coroner. The examination is conducted by Deirdre Amaro, M.D., Forensic Pathologist, and assisted by Jason Stewart and John DeBrodie, Forensic Technicians of the Medical Examiner's Office. The examination is begun at 9:15 A.M.

When first viewed, the body is clothed in shorts, socks, undershorts, and hospital gown.

EVIDENCE OF MEDICAL INTERVENTION:

1. EKG and defibrillator pads.
2. Intravascular catheter, dorsal left hand.

EVIDENCE OF INJURY:

1. Few superficial abrasions extend curvilinearly along the proximal posteromedial left forearm.

EXTERNAL EXAMINATION:

GENERAL: The remains are those of a well-developed, well-nourished adult male whose appearance is consistent with the given age of 39 years. The length of the body from the bottoms of the feet to the top of the head is 6 feet. The weight is 264 pounds, with a calculated body mass index of 35.8 kg/m². Rigor mortis is present. Faint livor mortis extends across the posterior surfaces of the body, except in areas exposed to pressure. There is no decomposition.

HEAD: The head hair is black. Black-gray facial hair is present in a beard and mustache distribution. The ears are normally configured and free of drainage. The eyes are normally set, and

the corneas are cloudy. The irises appear brown. The pupils are round. The sclerae are anicteric. The conjunctivae are translucent but congested, and no petechiae are identified in the bulbar or palpebral conjunctivae, facial skin, or oral mucosa. The nose is intact, and the nares are unobstructed. The dentition is natural and in adequate condition. The frena are intact and not contused.

NECK: The neck is normally formed and symmetric.

CHEST AND ABDOMEN: The chest is normally formed and symmetric, without palpable masses. The abdomen is soft and obese, without palpable masses.

EXTERNAL GENITALIA: The external genitalia are those of a normal adult male with both testes palpable in the scrotum.

BACK: The spine is normal to palpation. The surface of the back is free of lesions. The anus is atraumatic.

EXTREMITIES: The arms are normally formed and symmetric, without the absence of digits. Acute puncture sites not attributable to medical intervention, ventral wrist scars, and track marks are not identified. The legs are normally formed and free of amputations, edema, and deformity.

BODY MARKINGS (SCARS AND TATTOOS):

1. Scar—Proximal anterior left upper arm, linear and nearly longitudinally oriented, 8 cm.
2. Scar—Dorsal left hand, linear and longitudinally oriented, 3 cm.
3. Scar—Dorsomedial left hand, linear and horizontally oriented, coarse, 2 cm.
4. Scar—Proximal posterolateral right forearm, linear and obliquely oriented, 2.5 cm.
5. Scar—Dorsal right hand, nearly linear and longitudinally oriented, 5 cm.
6. Scar—Proximal anteromedial left lower leg, linear and longitudinally oriented, 2 cm.
7. Scar—Distal anteromedial left lower leg, linear and longitudinally oriented, coarse, 7 cm.
8. Tattoos—Upper chest, monochromatic, including possible “PEST”.
9. Tattoo—Upper abdomen, monochromatic, banners with dates motif.
10. Tattoos—Back, monochromatic, illegible/unclear motif.
11. Tattoos—Left arm, monochromatic, including “RIP” and “TRUST NO ONE”.

12. Tattoos—Right arm, monochromatic, including possible “GAME TIGHT”.
13. Tattoos—Anterolateral left lower leg, monochromatic, including Mario motif.
14. Tattoos—Right lower leg, monochromatic, including skulls motif.

INTERNAL EXAMINATION:

BODY CAVITIES: The thoracic and abdominal organs are in their normal relations. The pericardial sac is midline and contains scant fluid. There are no hemorrhages or pathologic effusions in any of the body cavities. The diaphragmatic leaflets are intact and normally situated. The serosal surfaces are smooth, intact, and glistening.

NECK: Layered anterior neck dissection is performed. The dorsal tongue exhibits prominence and slight discoloration of the filiform papillae (hairy tongue). There are no hemorrhages or other abnormalities of the soft tissues of the neck, larynx, trachea, or cervical vertebral column. The hyoid bone and cartilaginous structures of the larynx and trachea are normally formed and without fracture. There are no subcapsular hemorrhages of the thyroid gland.

CARDIOVASCULAR: The heart weighs 560 grams and has a globose shape with right ventricular dilatation. The coronary arteries have a left dominant distribution, and the origins and paths of the coronary arteries are normal. The major epicardial arteries are widely patent. The right coronary artery is of small caliber. The left ventricular posterior wall thickness is 1.3 centimeters. The interventricular septal thickness is 1.4 centimeters. The right ventricular wall thickness is 0.4 centimeters. The valve circumferences are: tricuspid 13.6 centimeters; pulmonic 9.4 centimeters; mitral 12 centimeters; and aortic 8 centimeters. The valves are unremarkable. The foramen ovale is closed. There are no atrial/ventricular septal defects. There are no thrombi within the chambers. There are no abnormalities of the papillary muscles or chordae tendineae. The myocardium is red-brown and without evidence of scarring. There are no thrombi within the pulmonary artery. The aorta and its major branches display mild atherosclerosis. The great veins are unremarkable.

RESPIRATORY: The right and left lungs weigh 620 grams and 490 grams, respectively. There is minimal anthracosis. Focal blebs involve the left lung. There are no thrombi/emboli within the pulmonary arteries. The bronchi and bronchioles are unremarkable. The pulmonary arteries and their major branches are unremarkable. The parenchyma in all five lobes is edematous and congested but contains no cystic lesions, nodules, or distinct consolidations.

LIVER, COMMON BILE DUCT, GALL BLADDER AND PANCREAS: The liver weighs 1800 grams. The capsule is smooth and glistening. The parenchyma is soft and red-brown. No hemorrhages, nodules, or focal lesions are identified. The gallbladder contains approximately 20 mL of orange-yellow bile; no stones are identified. The pancreas is tan, lobulated, and firm.

GASTROINTESTINAL: The esophagus is unremarkable; no varices are identified. The stomach contains 600 mL of tan partially digested food material. No pill fragments are identified. The gastric and proximal duodenal mucosae are unremarkable. The remaining portions of the small intestine and colon are unremarkable to palpation and inspection. The appendix is identified.

GENITOURINARY: The right and left kidneys weigh 200 and 180 grams, respectively. The capsules strip with relative ease to reveal smooth, firm red-brown subcapsular surfaces. The cortices and medullae are distinct and unremarkable. A 1.5 x 2 x 1.5 cm benign cortical cyst involves the left renal cortex. Otherwise, there are no abnormalities of the papillae, calyceal systems, pelvises, or ureters. The urinary bladder contains no urine. The prostate gland is unremarkable. Intraparenchymal hemorrhage is not identified within the testes.

ENDOCRINE: Each adrenal gland has an unremarkable yellow cortex and gray medulla; a 1.3 x 1 x 1 cm nodular expansion involves the left adrenal cortex. The thyroid gland is robust, red-brown, and firm. The pituitary gland is unremarkable.

SPLEEN: The spleen weighs 200 grams. The capsule is smooth and glistening over diffuent purple parenchyma. The white pulp is grossly indiscernible.

LYMPHATIC: No lymphadenopathy is identified.

MUSCULOSKELETAL: There are no apparent abnormalities of the axial or appendicular skeletal systems or musculature.

HEAD: The scalp is free of hemorrhage. There are no fractures of the skull. There is no epidural, subdural, or subarachnoid hemorrhage. The brain weighs 1430 grams and is slightly edematous. The leptomeninges are translucent. The cranial nerves and cerebral vessels are unremarkable. The

cerebral hemispheres are symmetric, and there are no cortical lesions. The deep gray matter is unremarkable. There is symmetric fullness of the unci, and the cerebellar tonsils are minimally grooved. Sections of the cerebral hemispheres, brainstem, and cerebellum are unremarkable. All structures appear normal in size and shape.

ANCILLARY EXAMINATIONS:

MICROSCOPIC: Representative sections of all organs are retained in formalin for two years for possible further study.

RADIOGRAPHS: Not performed.

MICROBIOLOGY: A nasopharyngeal swab for SARS-CoV-2 by NAAT PCR is obtained on 02/01/2023 and reported as positive.

TOXICOLOGY: Samples of peripheral blood (A+B), vitreous fluid (C), urine (D), and liver (E) are obtained from the body at the time of the autopsy and submitted to the NMS Forensic Toxicology Laboratory.



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Robert A. Middleberg, PhD, F-ABFT, DABCC-TC, Laboratory Director

Toxicology Report

Report Issued 02/28/2023 14:05

To: 10821

University of Missouri Pathology Department - Med
Attn: Dori Burke
1 Hospital Dr, M173
Columbia, MO 65212

Patient Name LANCASTER, ALAN C

Patient ID 2023-055

Chain 23053172

DOB

Sex Male

Workorder 23053172

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Positive Findings:

Analyte	Result	Units	Matrix Source
Caffeine	Presump Pos	mcg/mL	001 - Iliac Blood
Naloxone	Presump Pos	ng/mL	001 - Iliac Blood
Xylazine	19	ng/mL	001 - Iliac Blood
Delta-9 THC	1.7	ng/mL	001 - Iliac Blood
Fentanyl	2.8	ng/mL	001 - Iliac Blood
4-ANPP	0.46	ng/mL	001 - Iliac Blood

See Detailed Findings section for additional information

Testing Requested:

Test	Test Name
8052B	Postmortem, Expanded, Blood (Forensic)

Specimens Received:

ID	Tube/Container	Volume/ Mass	Collection Date/Time	Matrix Source	Labeled As
001	Clear Cap Plastic Tube	8.5 mL	02/01/2023 10:15	Iliac Blood	2023-055
002	Clear Cap Plastic Tube	8 mL	02/01/2023 10:15	Iliac Blood	2023-055
003	Red Stopper Glass Tube	1 mL	02/01/2023 10:15	Vitreous Fluid	2023-055
004	Black Cap Plastic Container	47.2 g	02/01/2023 10:15	Liver Tissue	2023-055

All sample volumes/weights are approximations.

Specimens received on 02/09/2023.

Detailed Findings:

Analysis and Comments	Result	Units	Rpt. Limit	Specimen Source	Analysis By
Caffeine	Presump Pos	mcg/mL	0.20	001 - Iliac Blood	LC/TOF-MS
This test is an unconfirmed screen. Confirmation by a more definitive technique such as GC/MS is recommended.					
Naloxone	Presump Pos	ng/mL	1.0	001 - Iliac Blood	LC/TOF-MS
This test is an unconfirmed screen. Confirmation by a more definitive technique such as GC/MS is recommended.					
Xylazine	19	ng/mL	5.0	001 - Iliac Blood	LC-MS/MS
Delta-9 THC	1.7	ng/mL	0.50	001 - Iliac Blood	LC-MS/MS
Fentanyl	2.8	ng/mL	0.20	001 - Iliac Blood	LC-MS/MS
4-ANPP	0.46	ng/mL	0.20	001 - Iliac Blood	LC-MS/MS

Other than the above findings, examination of the specimen(s) submitted did not reveal any positive findings of toxicological significance by procedures outlined in the accompanying Analysis Summary.

Reference Comments:

1. 4-ANPP (Despropionyl fentanyl) - Iliac Blood:

4-ANPP (despropionylfentanyl) is a precursor chemical used in the production of fentanyl/fentanyl related analytes and is also a fentanyl metabolite and may be a metabolite of other fentanyl-related analytes. It is considered to be pharmacologically weak.

2. Delta-9 THC (Active Ingredient of Marijuana) - Iliac Blood:

Delta-9 THC is the principle psychoactive ingredient of marijuana (cannabis, hashish). It is also the active component of the prescription medication Marinol®. Marijuana use causes relaxation, distorted perception, euphoria and feelings of well being, along with confusion, dizziness, somnolence, ataxia, speech difficulties, lethargy and muscular weakness.

After smoking a user-preferred 300 mcg/kg dose average plasma THC concentrations at 35 minutes were reported at 16.1 (range 4.7-30.9) ng/mL, and had declined to 1.5 (range 0.4-3.2) ng/mL after 190 minutes. Usual peak levels in serum for 1.75% or 3.55% THC marijuana cigarettes: 50-270 ng/mL at 6 to 9 minutes after beginning smoking, decreasing to less than 5 ng/mL by 2 hrs. Whole blood THC concentrations are typically half those in a corresponding plasma sample.

3. Fentanyl (Duragesic®; Sublimaze®) - Iliac Blood:

Fentanyl is a prescription opioid commonly used as an anesthetic/analgesic. It is reported to be 80 to 200 times as potent as morphine and has a rapid onset of action as well as addictive properties. Illicit fentanyl is readily available due to low production cost and its high potency. It is often sold as heroin and is commonly found in combination with other illicit drugs. Signs associated with fentanyl toxicity include severe respiratory depression, muscle rigidity, seizures, hypotension, coma and death.

When used clinically as a transdermal preparation (25-100 mcg/hour patch), serum fentanyl concentrations up to 3.8 ng/mL have been reported within 24 hours. Following removal of the patch, serum fentanyl concentrations are reported to decrease with a mean elimination half-life of 17 hours (range, 13-22 hours). The mean peak plasma serum fentanyl concentration in adults given an 800 mcg oral transmucosal fentanyl preparation over 15 minutes is reported at 2.1 ng/mL (range, 1.4-3.0 ng/mL) at approximately 0.40 hours.

It is reported that patients lost consciousness at mean plasma levels of fentanyl of 34 ng/mL when infused with 75 mcg/Kg over a 15 min period; peak plasma levels averaged 50 ng/mL. In fatalities from fentanyl, blood concentrations are variable and have been reported as low as 3 ng/mL. Postmortem blood fentanyl concentrations ranged from 0.30-110 ng/mL (median 11 ng/mL) in 301 femoral blood specimens obtained from accidental drug overdose death investigations. These concentrations ranged from 9.7-41.3 ng/mL (median 17.2 ng/mL) in 7 fentanyl only cases in another published case series.

The blood to plasma ratio for fentanyl is approximately 0.80-1.0.

Reference Comments:

4. Xylazine (Rompun®) - Iliac Blood:

Xylazine is used as a veterinary sedative, analgesic, and anesthetic in large animals (e.g., cattle). The pharmacokinetics of xylazine in humans are not well known. A driver exhibiting slurred speech and sluggish movements had a blood concentration of 570 ng/mL. Ten deaths resulting from combined use of heroin and xylazine had 300 to 5000 ng/mL xylazine in postmortem blood. A fatality from intravenous injection had a postmortem blood concentration of 200 ng/mL.

Unless alternate arrangements are made by you, the remainder of the submitted specimens will be discarded one (1) year from the date of this report; and generated data will be discarded five (5) years from the date the analyses were performed.

Workorder 23053172 was electronically signed on 02/28/2023 13:29 by:



Meaghan M. Ringel, M.S.F.S., D-ABFT-FT
Forensic Toxicologist

Analysis Summary and Reporting Limits:

All of the following tests were performed for this case. For each test, the compounds listed were included in the scope. The Reporting Limit listed for each compound represents the lowest concentration of the compound that will be reported as being positive. If the compound is listed as None Detected, it is not present above the Reporting Limit. Please refer to the Positive Findings section of the report for those compounds that were identified as being present.

Test 52135B - Xylazine Confirmation, Blood - Iliac Blood

-Analysis by High Performance Liquid Chromatography/ Tandem Mass Spectrometry (LC-MS/MS) for:

<u>Analyte</u>	<u>Rpt. Limit</u>	<u>Analyte</u>	<u>Rpt. Limit</u>
Xylazine	5.0 ng/mL		

Test 52198B - Cannabinoids Confirmation, Blood - Iliac Blood

-Analysis by High Performance Liquid Chromatography/ Tandem Mass Spectrometry (LC-MS/MS) for:

<u>Analyte</u>	<u>Rpt. Limit</u>	<u>Analyte</u>	<u>Rpt. Limit</u>
11-Hydroxy Delta-9 THC	1.0 ng/mL	Delta-9 THC	0.50 ng/mL
Delta-9 Carboxy THC	5.0 ng/mL		

Test 52486B - Fentanyl and 4-ANPP Confirmation, Blood - Iliac Blood

-Analysis by High Performance Liquid Chromatography/ Tandem Mass Spectrometry (LC-MS/MS) for:

<u>Analyte</u>	<u>Rpt. Limit</u>	<u>Analyte</u>	<u>Rpt. Limit</u>
4-ANPP	0.20 ng/mL	Fentanyl	0.20 ng/mL
Acetyl Fentanyl	0.20 ng/mL	Norfentanyl	0.40 ng/mL

Test 8052B - Postmortem, Expanded, Blood (Forensic) - Iliac Blood

-Analysis by Enzyme-Linked Immunosorbent Assay (ELISA) for:

<u>Analyte</u>	<u>Rpt. Limit</u>	<u>Analyte</u>	<u>Rpt. Limit</u>
Barbiturates	0.040 mcg/mL	Gabapentin	5.0 mcg/mL
Cannabinoids	10 ng/mL	Salicylates	120 mcg/mL



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Workorder 23053172
Chain 23053172
Patient ID 2023-055

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Analysis Summary and Reporting Limits:

-Analysis by Headspace Gas Chromatography (GC) for:

<u>Analyte</u>	<u>Rpt. Limit</u>	<u>Analyte</u>	<u>Rpt. Limit</u>
Acetone	5.0 mg/dL	Isopropanol	5.0 mg/dL
Ethanol	10 mg/dL	Methanol	10 mg/dL

-Analysis by High Performance Liquid Chromatography/Time of Flight-Mass Spectrometry (LC/TOF-MS) for: The following is a general list of analyte classes included in this screen. The detection of any specific analyte is concentration-dependent. Note, not all known analytes in each specified analyte class are included. Some specific analytes outside of these classes are also included. For a detailed list of all analytes and reporting limits, please contact NMS Labs. Amphetamines, Anticonvulsants, Antidepressants, Antihistamines, Antipsychotics, Benzodiazepines, CNS Stimulants, Cocaine and Metabolites, Hallucinogens, Hypnosedatives, Muscle Relaxants, Non-Steroidal Anti-Inflammatory Agents, Opiates and Opioids.